



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 283 435 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
21.05.2003 Bulletin 2003/21

(51) Int Cl.7: **G02F 1/137**, G02F 1/1334,
G09G 3/36

(43) Date of publication A2:
12.02.2003 Bulletin 2003/07

(21) Application number: **02078067.2**

(22) Date of filing: **26.07.2002**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
IE IT LI LU MC NL PT SE SK TR
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **07.08.2001 US 923659**

(71) Applicant: **EASTMAN KODAK COMPANY**
Rochester, New York 14650 (US)

(72) Inventors:
• **Mi, Xiang-Dong, Eastman Kodak Company**
Rochester, New York 14650-2201 (US)
• **Stephenson, Stanley Ward,**
Eastman Kodak Company
Rochester, New York 14650-2201 (US)

(74) Representative: **Parent, Yves**
KODAK INDUSTRIE,
Département Brevets,
CRT - Zone Industrielle
71102 Chalon-sur-Saône Cedex (FR)

(54) **Gray scale and color cholesteric liquid crystal displays**

(57) A cholesteric liquid crystal display (10) with gray scales is disclosed which includes a substrate (15), a patterned first conductor (20) disposed over the substrate, and a layer (30) including a cholesteric liquid crystal material dispersed over the first patterned conductor. The display further includes a patterned second conductor (40) disposed over the layer including chol-

estic liquid crystal, and control means for applying voltages across particular portions of the patterned first and second conductors to cause electric fields to portions of the cholesteric liquid crystal layer to directly change its reflectance to a particular state having a selected gray level. The gray scale of the display can thus be obtained by a single pulse voltage independent of the initial state of the said display.

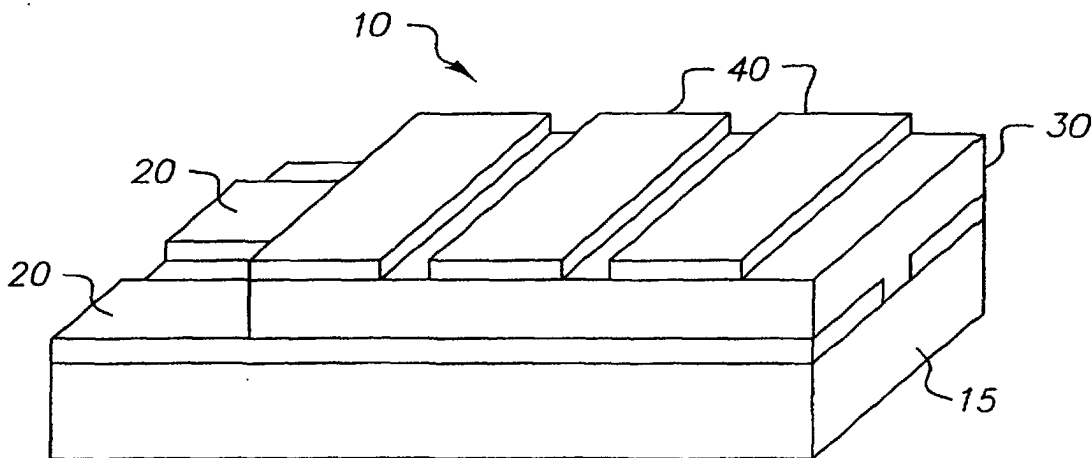


FIG. 1

EP 1 283 435 A3

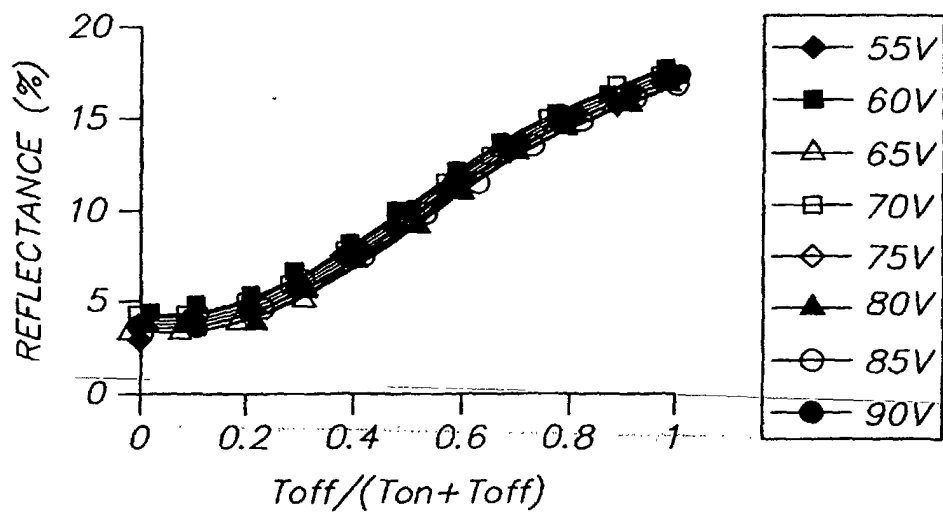


FIG. 6B



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 07 8067

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 1 116 771 A (EASTMAN KODAK CO) 18 July 2001 (2001-07-18) * column 2, line 28 - column 9, line 6; figure 2B *	1,2,4,5	G02F1/137 G02F1/1334 G09G3/36
Y	---	3,6	
Y	US 6 061 107 A (DOANE J WILLIAM ET AL) 9 May 2000 (2000-05-09) * column 1, line 22 - column 4, line 49; figures 1A-C,5 *	1,2,5	
Y,D	---	1-5	
Y,D	US 5 251 048 A (DOANE J WILLIAM ET AL) 5 October 1993 (1993-10-05) * column 1, line 21 - column 5, line 65 *	1-5	
Y	---	3,4	
Y	WO 01 20592 A (PHEIFFER MATHIAS ;THREE FIVE SYSTEMS INC (US)) 22 March 2001 (2001-03-22) * page 1, line 19 - page 6, line 26; figures 2,4,5 *	3,4	
Y,D	---	6	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G02F G09G
	HUANG X Y ET AL: "FULL COLOR (4096 COLORS) REFLECTIVE CHOLESTERIC LIQUID CRYSTAL DISPLAY" PROCEEDINGS OF THE 18TH. INTERNATIONAL DISPLAY RESEARCH CONFERENCE. ASIA DISPLAY 98. SEOUL, SEPT. 28 - OCT. 1, 1998, INTERNATIONAL DISPLAY RESEARCH CONFERENCE. IDRC, SAN JOSE, CA: SID, US, vol. CONF. 18, 28 October 1998 (1998-10-28), pages 883-886, XP000921814 * page 883 - page 884; figure 1 * -----		
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 17 March 2003	Examiner Thomas, K
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 07 8067

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-03-2003

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1116771	A	18-07-2001	US 6423368 B1	23-07-2002
			EP 1116771 A2	18-07-2001
			JP 2001194656 A	19-07-2001

US 6061107	A	09-05-2000	NONE	

US 5251048	A	05-10-1993	NONE	

WO 0120592	A	22-03-2001	AU 7703900 A	17-04-2001
			WO 0120592 A1	22-03-2001
